

CLAIMS:

We claim:

1. A fiber-containing substrate with a first surface and a second surface having integral microscopic surface structures upon at least a portion of at least one of its surfaces, wherein said integral microscopic surface structures have projections substantially normal to the plane of said fiber-containing substrate, said at least one surface comprised of:
 - (a) portions having a plurality of substantially unbroken fibers comprising surface structures along at least part of the length of said fibers, and wherein said fibers have a Roughness Factor greater than or equal to about 1.10.
2. The fiber-containing substrate of claim 1 wherein said integral microscopic surface structures have a size less than about 100 μm .
3. The fiber-containing substrate of claim 1 wherein said integral microscopic surface structures are present upon at least 10% of at least one of its surfaces.
4. The fiber-containing substrate of claim 1 wherein said integral microscopic surface structures are present upon at least 15% of at least one of its surfaces.
5. The fiber-containing substrate of claim 1 wherein said integral microscopic surface structures are present upon at least 20% of at least one of its surfaces.

6. The fiber-containing substrate of claim 1 wherein said fiber-containing substrate further comprises a repellent component upon said at least one surface.
7. The fiber-containing substrate of claim 6 wherein said repellent component is selected from the group consisting of fluorocarbon-containing chemicals, silicones, waxes, and combinations thereof.
8. The fiber-containing substrate of claim 7 wherein said repellent component is a fluorocarbon-containing chemical.
9. The fiber-containing substrate of claim 8 wherein said fluorocarbon-containing chemical is a fluoroacrylate-containing composition or a fluorourethane-containing composition.
10. The fiber-containing substrate of claim 6 wherein said fiber-containing substrate further comprises a crosslinking component upon said at least one surface.
11. The fiber-containing substrate of claim 10 wherein said crosslinking component is a polyurethane-based material.
12. The fiber-containing substrate of claim 1 wherein said fiber-containing substrate further comprises a particulate component upon said at least one surface.
13. The fiber-containing substrate of claim 12 wherein said particulate component comprises particles having an average particle size between about 1 nm and about 50 μm .

14. The fiber-containing substrate of claim 12 wherein said particulate component comprises particles having an average particle size between about 5 nm and about 1 μm .

15. The fiber-containing substrate of claim 12 wherein said particulate component comprises particles having an average particle size between about 10 nm and about 50 nm.

16. The fiber-containing substrate of claim 12 wherein said particulate component is comprised of at least one material selected from the group consisting of silicates, doped silicates, minerals, silicas, polymers, carbon, graphite, metal salts, metal powders, silica-coated metal powders, inorganic oxides, and combinations thereof.

17. The fiber-containing substrate of claim 16 wherein said particulate component is a silica-based material.

18. The fiber-containing substrate of claim 17 wherein said silica-based material is colloidal silica.

19. The fiber-containing substrate of claim 12 wherein said fiber-containing substrate further comprises a crosslinking component upon said at least one surface.

20. The fiber-containing substrate of claim 19 wherein said crosslinking component is a polyurethane-based material.

21. The fiber-containing substrate of claim 1 wherein said fiber-containing substrate further comprises a repellent component, a particulate component, and a crosslinking component.
22. The fiber-containing substrate of claim 1 wherein said fibers have a Roughness Factor greater than or equal to about 1.20.
23. The fiber-containing substrate of claim 1 wherein said fibers have a Roughness Factor greater than or equal to about 1.30.
24. The fiber-containing substrate of claim 1 wherein said fiber-containing substrate comprises a woven fabric.
25. The fiber-containing substrate of claim 1 wherein said fiber-containing substrate comprises a non-woven fabric.
26. The fiber-containing substrate of claim 1 wherein said fiber-containing substrate comprises a knitted fabric.
27. The fiber-containing substrate of claim 1 wherein said fiber-containing substrate comprises a laid scrim.
28. A fiber-containing substrate with a first surface and a second surface having integral microscopic surface structures upon at least a portion of at least one of its surfaces, wherein said integral microscopic surface structures have projections

substantially normal to the plane of said fiber-containing substrate, said at least one surface comprised of:

- (a) portions having a plurality of substantially unbroken fibers comprising surface structures along at least part of the length of said fibers, and wherein said fibers have a Roughness Factor greater than or equal to about 1.10; and
- (b) a repellent component.

29. The fiber-containing substrate of claim 28 wherein said fiber-containing substrate further comprises a crosslinking component upon said at least one surface.

30. The fiber-containing substrate of claim 28 wherein said fiber-containing substrate further comprises a particulate component upon said at least one surface.

31. The fiber-containing substrate of claim 29 wherein said fiber-containing substrate further comprises a particulate component upon said at least one surface.

32. A fiber-containing substrate with a first surface and a second surface having integral microscopic surface structures upon at least a portion of at least one of its surfaces, wherein said integral microscopic surface structures have projections substantially normal to the plane of said fiber-containing substrate, said at least one surface comprised of:

- (a) portions having a plurality of substantially unbroken fibers comprising surface structures along at least part of the length of said fibers, and wherein said fibers have a Roughness Factor greater than or equal to about 1.10;

- (b) a repellent component; and
- (c) a particulate component.

33. The fiber-containing substrate of claim 32 wherein said fiber-containing substrate further comprises a crosslinking component upon said at least one surface.

34. A composite textile substrate comprising:

(I) at least one layer of a fiber-containing substrate with a first surface and a second surface having integral microscopic surface structures upon at least a portion of at least one of its surfaces, wherein said integral microscopic surface structures have projections substantially normal to the plane of said fiber-containing substrate, said at least one surface comprised of:

(a) portions having a plurality of substantially unbroken fibers comprising surface structures along at least part of the length of said fibers, and wherein said fibers have a Roughness Factor greater than or equal to about 1.10; and

(II) at least one additional layer of material selected from the group consisting of fiber-containing substrates, films, coatings, foams, reinforcing substrates, and adhesives.

35. The composite textile substrate of claim 34 wherein said fiber-containing substrate further comprises a repellent component.

36. The composite textile substrate of claim 35 wherein said fiber-containing substrate further comprises a crosslinking component.

37. The composite textile substrate of claim 34 wherein said fiber-containing substrate further comprises a particulate component.

38. The composite textile substrate of claim 37 wherein said fiber-containing substrate further comprises a crosslinking component.

39. The composite textile substrate of claim 34 wherein said fiber-containing substrate further comprises a repellent component, a particulate component, and a crosslinking component.

40. A composite textile substrate comprising:

(I) at least one layer of a fiber-containing substrate with a first surface and a second surface having integral microscopic surface structures upon at least a portion of at least one of its surfaces, wherein said integral microscopic surface structures have projections substantially normal to the plane of said fiber-containing substrate, said at least one surface comprised of:

(a) portions having a plurality of substantially unbroken fibers comprising surface structures along at least part of the length of said fibers, and wherein said fibers have a Roughness Factor greater than or equal to about 1.10; and

(b) a repellent component; and

(II) at least one additional layer of material selected from the group consisting of fiber-containing substrates, films, coatings, foams, reinforcing substrates, and adhesives.

41. The composite textile substrate of claim 40 wherein said fiber-containing

substrate further comprises a crosslinking component.

42. The composite textile substrate of claim 40 wherein said fiber-containing substrate further comprises a particulate component.

43. The composite textile substrate of claim 42 wherein said fiber-containing substrate further comprises a crosslinking component.

44. A composite textile substrate comprising:

(I) at least one layer of a fiber-containing substrate with a first surface and a second surface having integral microscopic surface structures upon at least a portion of at least one of its surfaces, wherein said integral microscopic surface structures have projections substantially normal to the plane of said fiber-containing substrate, said at least one surface comprised of:

(a) portions having a plurality of substantially unbroken fibers comprising surface structures along at least part of the length of said fibers, and wherein said fibers have a Roughness Factor greater than or equal to about 1.10; and

(b) a repellent component; and

(c) a particulate component; and

(II) at least one additional layer of material selected from the group consisting of fiber-containing substrates, films, coatings, foams, reinforcing substrates, and adhesives.

45. The composite textile substrate of claim 44 wherein said fiber-containing substrate further comprises a crosslinking component.